



**The Effect of Video Media on Female Adolescents' Knowledge
About Anemia at SMP Negeri 4 Semarang**

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ABSTRACT

Adolescent girls are more susceptible to anemia. One of the main causes is the monthly blood loss due to menstruation during puberty, which increases the need for iron intake to maintain adequate hemoglobin levels. Since anemia remains a current public health issue, follow-up actions are necessary to reduce its prevalence. A preventive effort to address anemia is through providing health education about the condition. Effective health education requires appropriate media and methods to enhance the knowledge of adolescent girls. Video media can serve as a more effective option for delivering health education as it conveys information in a more engaging and easily understood manner. This study used a quasi-experimental research with a control group, using a pre-posttest design. The sample was selected using random sampling, consisting of 80 respondents divided into two groups: an intervention group (video media) and a control group (lecture with Q&A), with 40 respondents in each group. Data were analyzed using an independent t-test. The results showed a greater increase in knowledge in the intervention group compared to the control group, with a p-value of 0.003. This indicates that video media has a significant effect on adolescent girls' knowledge about anemia. It is recommended that video media be used as a tool for adolescent health education in school environments.

Keywords: adolescent girls; anemia; knowledge; video media

Introduction

Anemia is a significant health issue among adolescent girls, particularly during adolescence when physiological changes such as menstruation result in iron loss from the body [1]. In addition to physiological factors, an unhealthy lifestyle such as irregular sleep patterns, poor dietary habits, and low consumption of vegetables and fruits also contributes to an imbalance in iron intake that can trigger anemia [2]. This iron deficiency leads to a decrease in hemoglobin levels in the blood, which reduces the blood's capacity to transport oxygen to body tissues, thereby causing symptoms such as weakness, fatigue, and decreased concentration [3].

Data from the World Health Organization (WHO) show that approximately 20% of adolescent girls aged 10–19 years suffer from anemia [4]. In Indonesia, the prevalence of anemia among the 15–24 age group reaches 18.4% [5]. Meanwhile, in Semarang City, the incidence of anemia among adolescent girls has even increased significantly, reaching 29% in 2022 [6]. This condition is a concern because anemia can reduce the quality of life of adolescents, for example by impairing academic performance, decreasing immunity, and lowering antibody levels, thus making them more susceptible to infections [2]. Therefore, if anemia is not addressed early, it may potentially lead to serious complications in the future, such as maternal mortality, low birth weight, and stunting [7].

The risk factors for anemia are not only related to nutritional intake but are also influenced by the lack of motivation among adolescents to seek information and the limited family support, especially because anemia related to menstruation is often considered a sensitive topic to discuss [1]. A study by Laksmi and Yenie (2018) showed that good knowledge about anemia is positively correlated with effective preventive behaviors [8]. Therefore, the role of health professionals in providing appropriate education through engaging approaches is highly needed to improve knowledge and preventive behaviors related to anemia among adolescent girls [7].

In the digital era and with the advancement of information technology, video-based educational media is increasingly regarded as an effective and efficient method for improving adolescents' health knowledge [9]. Video media has the advantage of engaging multiple senses simultaneously, thereby enhancing information absorption and memory retention compared to conventional media such as leaflets or posters [10]. Several experimental studies have also confirmed the effectiveness of video media in improving adolescent girls' knowledge and attitudes toward anemia.

This study aimed to analyze the effect of video media on anemia knowledge among adolescent girls at SMP Negeri 4 Semarang. The video media used in this study is adapted from the CAMAR (Cegah Anemia Masa Remaja) video, developed by Ms. Munica Rita H., S.SiT, M.Kes. The video was published on YouTube (@kebidananpolkesyo6627). This study is expected to provide empirical evidence supporting the use of video media as an effective health education tool. The results are also expected to make a significant contribution to the development of anemia prevention strategies and to improving the quality of life of adolescent girls in Indonesia.

Research Method

This study employed a quantitative design using a quasi-experimental pre-test and post-test with control group design to investigate the effect of video media on anemia knowledge among adolescent girls. The study was conducted at SMP Negeri 4 Semarang from January 2025.

The sample consisted of 80 ninth-grade female students who were selected through random sampling using a lottery method, and based on the following inclusion criteria: adolescent girls aged 13–15 years, having experienced menstruation, had not received comprehensive information about anemia in the past year, and willing to participate as respondents. The sample was divided into two groups: the intervention group (video media) and the control group (lecture and question-and-answer session). The independent variable in this study was the educational video media, while the dependent variable was the adolescents' knowledge about anemia.

The research process was conducted in several stages, namely coordination with guidance and counseling teachers as well as the student affairs division, selection of respondents based on the inclusion criteria, random allocation of participants into two groups, explanation of the procedures and obtaining informed consent, administration of the pre-test, implementation of the intervention (Lecture and Question-and-Answer and educational counseling using video media), and finally, administration of the post-test. Knowledge was measured using a 25-item questionnaire developed and tested for validity and reliability by the researchers. The questionnaire employed the Guttman scale (true–false) and covered several aspects, including definition, signs and symptoms, diagnosis, impact, and prevention of anemia. The validity test showed that all items were valid ($r\text{-count} > 0.361$), and the reliability (test demonstrated high internal consistency with a Cronbach's α value of $0.914 > 0.6$).

Data analysis was conducted using univariate descriptive analysis (mean, standard deviation, and mean difference) and bivariate analysis begins with a normality test with the results obtained that the data was normally distributed and homogeneous, so the research data was tested using a parametric test, namely the independent T-test to determine the difference in knowledge between the intervention and control groups after the intervention. This study obtained ethical approval from the Medical/Health Research Bioethics Commission of the Faculty of Medicine, Sultan Agung Islamic University Semarang, with approval number: 23/I/2025/Komisi Bioetik.

Results and Discussion

Table 1.
Mean Knowledge Scores Before and After Education Provided Through Lecture and Question-and-Answer Method

Knowledge	N	Mean	SD	Min	Max
<i>Pretest</i>	40	16,35	2,293	12	22
<i>Posttest</i>	40	18,68	2,433	12	23

Based on Table 1, it was found that the mean knowledge score of respondents in the pre-test was 16.35, while the post-test mean score was 18.68, indicating an increase in the mean score of 2.33. In addition, based on the standard deviation of knowledge about anemia, the data variability showed a slight increase, with no change in the minimum score and a slight increase of 1 point in the maximum score.

The percentage of respondents' knowledge before and after receiving education through lecture and question-and-answer methods in the control group is presented in Table 2 below:

Table 2.
Percentage of Respondents' Knowledge Before and After Education Provided Through Lecture and Question-and-Answer Method

No	Knowledge Questionnaire Items on Anemia Among Adolescent Girls	Before Correct	After Correct
1.	Anemia is a condition in which the hemoglobin (Hb) level in the blood is lower than normal.	40 (100%)	40 (100%)
2.	Lack of iron intake is not included as a cause of anemia in adolescents*	27 (68%)	28 (70%)
3.	Adolescent girls are more susceptible to anemia because they enter puberty and experience menstruation	39 (98%)	39 (98%)
4.	Anemia is a condition in which there is an increase in blood cells in the body*	31 (78%)	37 (93%)
5.	A red blood cell count below the normal range is not referred to as anemia*	26 (65%)	28 (70%)
6.	Adolescents who consume excessive iron may develop anemia*	28 (70%)	32 (80%)
7.	Adolescent girls with infectious diseases such as worm infestations can develop anemia	15 (38%)	15 (38%)
8.	A hemoglobin (Hb) level below normal is referred to as anemia	29 (73%)	31 (78%)
9.	Experiencing dizziness accompanied by pale palms, face, and gums indicates an excess of red blood cells*	22 (55%)	28 (70%)
10.	Strict dieting without paying attention to iron intake can make adolescents more vulnerable to anemia	18 (45%)	20 (50%)
11.	Adolescents with anemia may experience dizziness, drowsiness, and even shortness of breath	32 (80%)	33 (83%)
12.	Adolescent girls during menstruation need twice as much iron*	18 (45%)	15 (38%)
13.	The 5 conditions (<i>weakness, fatigue, exhaustion, listlessness, and lack of energy</i>) is a sign of anemia	26 (65%)	36 (90%)
14.	A hemoglobin level <12 g/dl in adolescents is not categorized as anemia*	27 (68%)	34 (85%)
15.	Anemia does not affect a person's daily productivity*	26 (65%)	33 (83%)
16.	Cognitive disturbances such as difficulty concentrating among students can be caused by anemia	28 (70%)	34 (85%)
17.	Experiencing anemia does not lead to decreased productivity in adolescents*	30 (75%)	35 (88%)
18.	An adolescent aged 12–14 years with anemia has a hemoglobin level <12 g/dl	23 (58%)	32 (80%)

19.	Anemia causes the hemoglobin/red blood cells to be unable to carry oxygen to the brain, resulting in dizziness and drowsiness	14 (35%)	16 (40%)
20.	Experiencing anemia from an early age can have long-term impacts during adulthood, including during marriage, pregnancy, and childbirth, such as low birth weight and stunting	26 (65%)	32 (80%)
21.	Anemia can be prevented by regularly consuming iron supplements	25 63%	34 (85%)
22.	Increased iron intake can be obtained by consuming iron-rich animal sources (such as chicken, fish, meat) and protein sources (such as eggs, tofu, and tempeh)	25 (63%)	27 (68%)
23.	Adolescent girls can take iron tablets 1–2 hours after meals	25 (63%)	32 (80%)
24.	Consuming tea and coffee can increase iron absorption from food because they contain caffeine	33 (83%)	32 (80%)
25.	Iron absorption can be enhanced by consuming vegetables and fruits rich in vitamin C, such as guava, pineapple, and oranges*	21 (53%)	24 (60%)

*Unfavorable

Based on Table 2, it was found that, among the 25 knowledge statements before receiving education through the lecture and question-and-answer method, the highest number of incorrect answers was on item number 19 (Anemia causes hemoglobin/red blood cells to be unable to carry oxygen to the brain, resulting in dizziness and drowsiness). Meanwhile, there was a significant decrease of 3 points in correct answers on item number 12 (Adolescent girls during menstruation need twice as much iron). The item that showed no improvement and had the lowest knowledge score before and after education was item number 7 (Adolescent girls with infectious diseases such as worm infestations can develop anemia). This indicates that there is a need for more comprehensive education regarding the definition and causes of anemia.

Meanwhile, the results of respondents' knowledge about anemia in the intervention group, who received educational counseling through video media, can be seen in Table 3 below:

Table 3.
Mean Knowledge Scores Before and After Education Provided Through Video Media

Knowledge	N	Mean	SD	Min	Max
<i>Pretest</i>	40	13,63	2,579	9	19
<i>Posttest</i>	40	20,47	2,801	12	29

Based on Table 3, it was found that the mean knowledge score of respondents in the pre-test was 13.63, while in the post-test, the mean score was 20.47, indicating an increase of 6.84 points. In addition, based on the standard deviation of knowledge about anemia, data variability showed a slight increase, with a 3 point increase in the minimum score and a 10 point increase in the maximum score.

The percentage of respondents' knowledge before and after receiving education through video media in the intervention group can be seen in Table 4 below:

Table 4.
Percentage of Respondents' Knowledge Before and After Lecture and Question-and-Answer

No	Knowledge Questionnaire Items on Anemia Among Adolescent Girls	Before Correct	After Correct
1.	Anemia is a condition in which the hemoglobin (Hb) level in the blood is lower than normal.	40 (100%)	40 (100%)
2.	Lack of iron intake is not included as a cause of anemia in adolescents*	24 (60%)	34 (85%)
3.	Adolescent girls are more susceptible to anemia because they enter puberty and experience menstruation	28 (70%)	36 (90%)
4.	Anemia is a condition in which there is an increase in blood cells in the body*	30 (75%)	33 (83%)
5.	A red blood cell count below the normal range is not referred to as anemia*	25 (63%)	38 (95%)
6.	Adolescents who consume excessive iron may develop anemia*	28	34

		(70%)	(85%)
7.	Adolescent girls with infectious diseases such as worm infestations can develop anemia	20 (50%)	34 (85%)
8.	A hemoglobin (Hb) level below normal is referred to as anemia	23 (58%)	39 (98%)
9.	Experiencing dizziness accompanied by pale palms, face, and gums indicates an excess of red blood cells*	19 (48%)	37 (93%)
10.	Strict dieting without paying attention to iron intake can make adolescents more vulnerable to anemia	19 (48%)	35 (88%)
11.	Adolescents with anemia may experience dizziness, drowsiness, and even shortness of breath	7 (18%)	23 (58%)
12.	Adolescent girls during menstruation need twice as much iron*	22 (55%)	33 (83%)
13.	The 5 conditions (<i>weakness, fatigue, exhaustion, listlessness, and lack of energy</i>) is a sign of anemia	27 (68%)	35 (88%)
14.	A hemoglobin level <12 g/dl in adolescents is not categorized as anemia*	17 (43%)	28 (70%)
15.	Anemia does not affect a person's daily productivity*	24 (60%)	34 (85%)
16.	Cognitive disturbances such as difficulty concentrating among students can be caused by anemia	20 (50%)	27 (68%)
17.	Experiencing anemia does not lead to decreased productivity in adolescents*	21 (53%)	36 (90%)
18.	An adolescent aged 12–14 years with anemia has a hemoglobin level <12 g/dl	14 (35%)	14 (35%)
19.	Anemia causes the hemoglobin/red blood cells to be unable to carry oxygen to the brain, resulting in dizziness and drowsiness	19 (48%)	28 (70%)
20.	Experiencing anemia from an early age can have long-term impacts during adulthood, including during marriage, pregnancy, and childbirth, such as low birth weight and stunting	21 (53%)	36 (90%)
21.	Anemia can be prevented by regularly consuming iron supplements	15 (38%)	33 (83%)
22.	Increased iron intake can be obtained by consuming iron-rich animal sources (such as chicken, fish, meat) and protein sources (such as eggs, tofu, and tempeh)	28 (70%)	37 (93%)
23.	Adolescent girls can take iron tablets 1–2 hours after meals	23 (58%)	37 (93%)
24.	Consuming tea and coffee can increase iron absorption from food because they contain caffeine	24 (60%)	28 (70%)
25.	Iron absorption can be enhanced by consuming vegetables and fruits rich in vitamin C, such as guava, pineapple, and oranges*	7 (18%)	26 (65%)

*Unfavorable

Based on Table 4, it was found that, among the 25 knowledge questions before the intervention using video media education on anemia, the highest number of incorrect answers occurred on item number 11 (Adolescents with anemia may experience dizziness, drowsiness, and even shortness of breath) and item number 25 (Iron absorption can be enhanced by consuming vegetables and fruits rich in vitamin C, such as guava, pineapple, and oranges). Meanwhile, the question that did not show a significant increase in correct answers was item number 18 (An adolescent aged 12–14 years with anemia has a hemoglobin level <12 g/dl). This indicates the need for more comprehensive education on the signs and symptoms, classification, and prevention of anemia.

Thus, it can be seen that there is a difference in respondents' knowledge about anemia after receiving education between the control group and the intervention group. This difference can be seen in Table 5 below:

Table 5.**Differences in respondents' knowledge about anemia after being given education in the control and intervention groups**

Group	Results		Mean	Σ Mean	P-Value*
	Pretest	Posttest			
Control	16,35	18,68	16,35	2,72	0,03
Intervention	13,63	20,47	18,38	1,79	

**Results Independent t-test*

Based on Table 5, the results of the Independent T-Test analysis on the final test results (posttest) of both groups show that the significance value shows $0.003 < 0.05$, so the results of the H_0 hypothesis are rejected and H_1 is accepted or interpreted as having an effect of video media on the knowledge of adolescent girls about anemia. In addition, there is a greater difference in the mean difference in the average value of knowledge before and after the intervention group, which is 2.72, while the control group is 1.79.

Respondents' knowledge about anemia in the control group was given education with a question and answer lecture

The increase in knowledge in the control group indicates that the lecture and question-and-answer method is effective in improving adolescent girls' understanding of anemia. This method provides opportunities for participants to ask questions and receive direct explanations, thereby strengthening the learning process and stimulating curiosity [11]. Direct counseling also allows health information, particularly on the topic of anemia, to be conveyed more clearly and understood more easily through verbal communication [12].

These findings are supported by a previous study by [13] which reported an increase in knowledge scores by 9.57 points after a nutrition education intervention, while a study by [14] reported an increase of 9.22 points through lectures and poster media. Both studies demonstrate the effectiveness of the lecture method in improving adolescents' knowledge about anemia.

However, the response analysis indicated that there was still a lack of knowledge among respondents regarding several important aspects of anemia before the education was provided. For example, many respondents did not understand that anemia symptoms such as dizziness and drowsiness are caused by low hemoglobin levels, which hinder oxygen distribution to the brain [15]. In addition, understanding of the definition of anemia and its causes, such as bleeding due to worm infections, was also still weak, as evidenced by the lack of score improvement on the related question [16].

Respondents' knowledge about anemia in the intervention group who were given educational counseling using video media

Health education supported by media has been proven to be more effective in increasing knowledge, especially among adolescents. One of the most engaging media is video, as it combines both visual and audio elements simultaneously, making the information easier to receive and understand [17]. Videos are also able to facilitate cognitive and psychomotor changes through the presentation of materials in a more convincing and interactive manner [18].

This study showed that counseling using video media had a significant impact on improving knowledge among adolescent girls. These results are consistent with the findings of [19], which reported an increase in knowledge scores by 3.2 points after a video media intervention. A similar study by [20] also reported an increase in knowledge scores by 1.78 points using the same method.

Despite the overall improvement, analysis of the questionnaire responses indicated that misunderstandings remained on several indicators. The highest number of incorrect answers appeared on questions related to anemia symptoms, such as dizziness, drowsiness, and shortness of breath. In fact, these symptoms are commonly caused by a lack of hemoglobin in the blood [21]. In addition, respondents' understanding of the importance of consuming vegetables and fruits rich in vitamin C to support iron absorption was also not uniform, as indicated by the responses to the related statement by [22] and [23].

Several questions related to the classification of anemia also showed only minimal improvement. This indicates that although video media is effective in conveying general information, technical material

such as hemoglobin threshold levels still requires reinforcement, either through material repetition or more specific visual approaches [24].

Differences in respondents' knowledge about anemia after being given education in the control and intervention groups

The difference test results showed a significant difference between the control and intervention groups after the education was provided. This difference indicates that educational media, particularly videos, have a stronger impact on increasing knowledge compared to the lecture and question-and-answer method. One of the main factors influencing this is the role of mass media in disseminating information effectively and engagingly [25].

Video media is considered superior because it engages both visual and auditory senses simultaneously, resulting in a higher information retention rate up to 94% compared to lectures, which rely mainly on auditory input at about 20% [26], [27]. This advantage includes realistic visualization of information, complete with color, motion, and sound, which facilitates understanding and enhances learning interest [27], [28].

As a non-print educational resource, video media is also considered easily accessible and helps the brain's neural processing of information more efficiently [29], [30]. The delivery of material through this media can encourage changes in the cognitive aspects of adolescents. This is supported by research by [31] which shows that health education can significantly improve knowledge. Knowledge is acquired through sensory processes, so the delivery method greatly affects its effectiveness [18], [32].

These findings align with various studies, one of which is the study by [33], which found an increase in adolescent knowledge after education through video. Another study by [34] also reported a significant difference between groups receiving video education and conventional lectures. A study by [35] supports these results by demonstrating a higher increase in knowledge in the group that received education through video media compared to those given leaflets.

The effectiveness of video media is also influenced by the characteristics of today's adolescents, who are more open-minded, tech-savvy, and fond of visual content. This makes video media an appropriate tool for delivering health messages because it can evoke emotions, encourage behavioral change, and produce faster impacts compared to traditional media [30], [36]

Limitations of the study is none.

Conclusion

This study showed a significant increase in knowledge after education was provided through both the lecture and question-and-answer method as well as video media. The control group receiving lectures experienced an average knowledge increase of 2.33 points, while the intervention group given video media showed a higher average increase of 6.84 points. The difference test results indicated a significant difference between the two groups, thus it can be concluded that video media has a positive effect on adolescent girls' knowledge about anemia at SMP Negeri 4 Semarang.

Based on these findings, it is recommended that schools regularly organize health education by utilizing engaging and relevant video media. Academic institutions can enrich learning resources by providing digital media and developing educational videos. Meanwhile, students are encouraged to actively seek health information from reliable sources, such as the Indonesian Ministry of Health, WHO, or UNICEF, to increase awareness and understanding of anemia. Furthermore, future researchers are advised to develop health education media further and expand this research to other variables.

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